

MISCELLANEOUS NOTES

1. DID TIGERS *PANTHERA TIGRIS TIGRIS* PASS THROUGH THE INDUS DELTA?

Maps and documents dealing with the former range of the Tiger in Pakistan show its known historical occurrence often not further south than 28.8° N nor further north than 30.0° N, and date hardly more than a hundred years back. With three locations for the Tiger along the Sutlej on his map, Mazak (1983) concluded that the species had surely advanced here from North India, although there is a gap of about 500 km towards his next Tiger location, further east along latitude 30.0° N. Today's global tiger distribution maps are often based on Mazak's interpretation (Fig. 1a). This note will make evident that

– tigers in Pakistan were formerly found as far north as 33.8° N and that

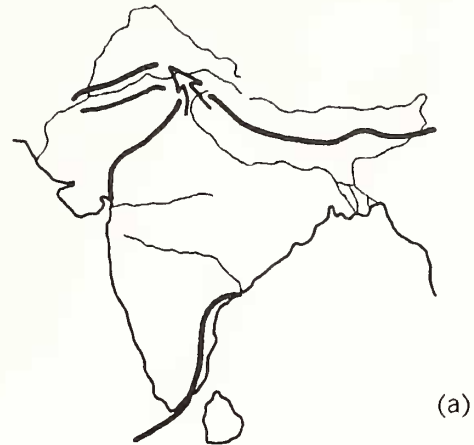
– tigers might have also found their way via Kachchh from India into Pakistan and inhabited the Indus Delta as far south as 24.0° N (Fig. 1b).

But at the beginning of the 20th Century the doomed Tiger population in Pakistan was already totally isolated (Fig. 1c).

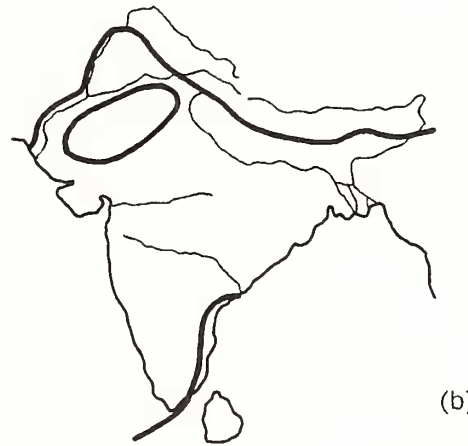
Newall (1887, p.183) hunted in 1854 in the jungle at the foothills near Village Noorpore, between Rawalpindi and Murrie, and mentioned “there were also one or two tigers near Noorpore, but we never came across them. One, however, was shot over water by Palliser”. Burton (1952, p.849) wrote “in 1852 a tiger killed an officer of the 98th Regiment 23 miles from Rawalpindi.” (Coordinates of Rawalpindi: 33.7° N, 73.1° E).

At the time when Alexander (about 325 BP) visited India, the Indus Delta was located further east and the coastline of the Arabian Sea extended further north-east into the navigable Eirinos Bay with the Samara Sea (25.0° N, 69.4° E) at the mouth of the easternmost Indus branch. Possibly due to tectonical forces, connected with the uplift of the Indian subcontinent and the raise of the Himalaya, the Indus Delta then shifted westwards. The Eirinos Bay shrank, became more and more dry and formed, approximately since the 11th Century, a salt marsh known as Rann of Kachchh. According to Wilhelmy (1966, 1968), who analysed historical geographical descriptions of two millennia, the last major westward change in the course of the Indus happened in 1758/59, after which only one main branch of the Indus enters the ocean, whereas earlier there had been up to 6-7 widespread branches.

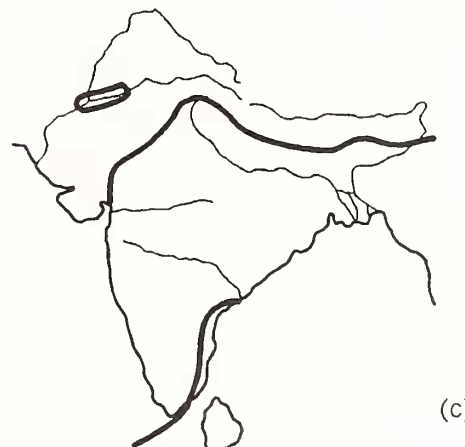
Today's desert regions east of the Indus, Thar Desert and Rann of Kachchh, may suggest that this arid zone was an impenetrable barrier for most terrestrial animals. But taking the former extent of the Indus Delta towards the east into



(a)



(b)



(c)

Fig. 1: Tiger distribution maps, based on data of Mazak (1983)
 (a) Mazak's interpretation (for the time around 1900)
 (b) new interpretation (for several hundred years ago)
 (c) new interpretation (for the time around 1900)
 with isolated tiger population in Pakistan

account, a rich vegetation belt with the function of a zoogeographical east-west bridge comes into consideration. Thus, it is possible that the Tiger once found its way west through the old Indus Delta, and went from there further north along the Indus.

The following lines summarise some additional information regarding the former distribution of the Tigers and its prey in Pakistan.

According to Roberts (1997), the middle and lower Indus (in Punjab and Sind) were once surrounded by a continuous belt of tamarisk *Tamarix dioica* jungle four to twelve miles wide, and tall cane grass *Saccharum munja*, inhabited by wild boar and hog deer. A few hog deer are still found on some tamarisk-studded islands in the mouth of the Indus. Therefore, there are good reasons to believe that Tigers, in conformity with the distribution of their prey base, existed once throughout the riverine tracts, including the Indus Delta.

As known from the Ganga Delta, Tigers have no problem living in a brackish and marshy environment. Compared to the Ganga Delta, the Indus Delta is not merely a mangrove forest, but consists, besides a small mangrove belt along the coastline, predominantly of tall grass and dense tamarisk thickets. While surveying the Indus Delta in 1837, Carless (1838) wrote: "In the woods wild hogs abound, and there is also an animal very common in the interior, which from the description, must be the elk ... A lynx and a leopard were seen, and tiger-cats three or four times." His 'elks' were obviously hog deer and his 'lynx' was maybe a caracal. The old term 'tiger-cat' was usually used for lesser cats and could mean here the fishing cat. Perhaps Carless' leopard was a tiger, as leopards are not reported by Roberts (1997) from these environs.

Murray (1884): "In Sind, the tiger happily is not common. It is found in the Khairpur State [northern boundary at 28.5° N, southern boundary at 26.0° N], but there are not many records of its causing destruction. In Lower Sind nothing is heard of it. From Sukkur (27.7° N) upwards it is said to occasionally issue from its cover, which is the dense fringe of tamarisk bushes and long grass along the banks of the river, visit the cultivated parts and carry away stray cattle." Langley (1860, p.152) wrote: "In Upper Sind tigers are rarely seen on the left bank of the river, but in Hyderabad country they are frequently met with, and many of the poor beaters were their

victims in the grand battues." Hyderabad country is located south of Khairpur State in Lower Sind and includes the region of the Indus Delta (towards 24.0° N).

Burnes (1834b, p. 141) admired a Tiger hunt of some sheikhs in Punjab and Newall (1887, p. 437) characterised passages of the river with "the dense grassy reaches down which a wandering tiger often strolls" when travelling down the Sutlej towards Bahawalpur in the summer of 1848. According to Roberts (1997), who reported shootings of 13 tigers in Punjab by an Amir of Bahawalpur State, the last tiger in Pakistan was shot in 1906 a few miles below Panjnad (about 29.3° N). The last survivor in Sind was shot in 1886 (Burton 1952, Eates 1968).

Macmurdo (1820, p. 215), when describing the province of Kachchh and the countries between Gujarat and the Indus, listed the Tiger at first position among the wild animals found there. Burnes (1834a, p. 103) stated that tigers were present along the Luni river in southwest Rajasthan (which falls into the Rann of Kachchh at about 24.5° N) and Stoliczka (1873, p. 226) wrote "both the lion and the tiger extremely rarely occur as stragglers from Kathivar, they had been formerly shot in Kachh territory, and a century ago they might have been more common". Campbell (1880, p. 30) believed "at the beginning of the century, lions, tigers, and other large game were plentiful in Cutch. But of late years, tigers and lions have almost entirely disappeared." According to these deliveries a zoogeographical bridge via Kutch towards the tiger distribution along the Indus river in the west seems to be imaginable. This speculation becomes quite plausible when taking the geographical changes of the delta into account.

Even today, the Indus Delta has considerable potential as a wildlife reserve, as Mountfort (1969, p. 189) judged. In fact, it would be the only suitable location for re-introducing tigers into Pakistan, although it is quite illusory to believe that high authorities as well as local communities could agree and find ways for solving financial, technical and scientific questions in adherence to the IUCN re-introduction guidelines. To keep this option open, however, the ecosystem of the Indus Delta, including the threatened hog deer population, should be well preserved.

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2. AN INSTANCE OF ADOPTION IN THE INDIAN FLYING FOX *PTEROPUS GIGANTEUS* (CHIROPTERA: PTEROPODIDAE)

Parental care among mammals is complex and species specific. Diverse forms of parental care have arisen among mammals, primarily determined by the precocity of the young. In practically all mammals, mothers accept only their own young for suckling and parental care. A major downside of parenting is that when an animal cares for young, it must forgo some other activities such as searching for food or mates (Alock 1998). The males of primates such as *Presbytis entellus* (McCann 1934) and *Presbytis cristatus* (Bernstein 1968) respond to individual infants in distress. Among bats, McCann (1940) reported an instance in *Rousettus leschenaulti*, where a young one had deserted the body of its dead mother and gone to another which already had a suckling young one.

Mother-infant contact in some species is intense and uninterrupted throughout the early period (Simonds 1965). In bats, during the first few days of life, the young would be carried during foraging flight (Griffin 1940). Mortality among bats is highest between the onset of independent flight and the end of the first year of life (Brosset 1962, Davis 1966). Social organisation serves to minimize this mortality (Bradbury 1977).

Communal raising of young is exhibited by some bats (Bradbury 1977). Two to ten adult females are found to take care of the young in the nursery roost at all times (O'Farrell and Studier 1973). Gopalakrishna and Badwaik (1993) reported that lactating females of *Miniopterus schreibersii fuliginosus* and *Rhinolophus rouxi* visit the groups of young left behind periodically, and suckle them on a community feeding basis. However, in *Hipposideros speoris*, mother and young recognise each other, and the mother suckles only her baby (Gopalakrishna and Badwaik 1993). Females of several other bats also specifically identify young (Kulzer 1958; Nelson 1965; Pearson *et al.* 1952, Davis *et al.* 1968). Incidence of adoption has been reported in some primates (Itani 1959, Rowell 1963). However, instances of adoption have rarely been observed among bats, though community raising and community suckling have been reported.

Since 1995, the authors have been regularly observing the feeding, roosting and breeding biology of *Pteropus*

giganteus in south Kerala. During April 2000, a female bat with her attached young (B₁), was recovered along with another young (B₂), whose mother died soon. B₂, the orphan, was smaller although born during the same season. The bats thus recovered were housed in a netted cage (1.5 x 1 x 1 m) for observation. Initially the mother bat, with her attached young, hung on one corner of the cage, while the orphaned young hung at the opposite corner, vocalising continuously. The expectation was that the female bat would be antagonistic to the orphan because it had a baby of its own. As the orphan was in early infancy, an attempt to hand feed it was unsuccessful. Surprisingly, the following morning the mother bat was nursing both the young ones – one attached to each nipple (Fig. 1). In fact, the mother bat had moved with its attached young one to the corner where the orphan was hanging.

Since then, the two young bats remained attached to the female, exchanging nipples occasionally. After a week, the bats were left free in a larger netted shelter (8 x 5 x 3 m), where they could move freely and even fly. At dusk, fruits like banana, papaya and cashew were provided with water *ad libitum*. In the morning, both the young ones were closely wrapped by the mother bat, probably a mechanism for thermoregulation, while at night she left them and went to the food tray. This is reflective of the wild, where mother bats leave young ones at nursery sites while foraging. Occasionally she carried the young ones during the night. By the end of April, they moved independently at night and started eating or at least biting at fruits.

In May, two more young female bats could be recovered from the same roost, they were found attached to small plants below the roost. These young ones (B₃ and B₄) could also have been born during the same season as B₁ and B₂. B₄ was larger than B₃ and the two were introduced into the bat shelter.

Initially, B₃ and B₄ remained away from the others (Fig. 2). At night all the young bats, except B₂, carried fruits from the food tray to different locations and fed independently, a foraging pattern exhibited in the wild where individuals carry fruit for consumption away from the group foraging tree. B₂, which was